

**AMENDMENTS TO THE SPECIFICATION:**

Please amend the specification as follows:

Please replace paragraphs 1 and 2 (lines 1-22) of page 1 with the following amended paragraphs:

**A THERMAL PROCESSING CHAMBER AND A METHOD OF THERMALLY PROCESSING PRODUCTS**

Field of the Invention

B  
The present invention relates to thermal processing of items in a continuous process, especially food products. The invention relates to a chamber and a method for heating or freezing food products by a combination ~~between~~ of thermal ~~convection~~ conduction between a conveyor belt and the product and thermal convection between a cooling or heating medium and the product. The combination provides a better product quality and a higher capacity of the chamber.

Description of the Prior Art

Devices and methods for ~~continuously~~ continuously freezing or heating food products e.g. for form freezing the food products exist. Known devices typically have conveying means for conveying the food products through either a heating or a freezing process. The conveying means are typically provided as conveyor belts with an open structure allowing either a cooling or a heating medium such as air to pass through the belt. The belts therefore have conveying surfaces which are non-uniform or rough and which typically causes unwanted structures in the food products as they are either heated or frozen while being supported on the surface. Furthermore the non-uniformity gives a poor thermal ~~convection~~ conduction from the surface of the conveyor belt to the food products and therefore the thermal efficiency of the devices is relatively low.

Please replace paragraph 3 (lines 12-26) of page 2 with the following amended paragraph:

According to the One object of the present invention relates to a thermal processing chamber for processing individual product items, said processing chamber comprising:  
- a conveyor for conveying the product items in the chamber, said conveyer comprising:

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- a conveyor belt forming an endless loop with a processing part and an idling part, the conveyor belt comprising a plurality of thermal conductive elements, each of the elements being adapted to obtain a first orientation in the processing part of the loop and adapted to obtain a second orientation in the idling part of the loop, the first orientation providing a substantially plan and continuous surface for supporting the product items across at least a number of the elements, and

- power driven means for advancing the conveyor belt,

wherein the thermal processing of the product items is performed by a thermal ~~convection~~ conduction from the elements to the product items.

Please replace paragraphs 3 and 4 (lines 17-31) on page 3 with the following amended paragraph

The thermal processing of the product items is preferably performed as a combination of a first thermal ~~convection~~ conduction between ~~from~~ the elements and ~~to~~ the product items and a second thermal convection between ~~from~~ the thermal media and ~~to~~ the product items.

*B<sup>3</sup>*  
The elements could be thermally influenced by a thermal convection ~~from~~ between the thermal media ~~to~~ and the elements or the thermal media could be influenced by a thermal convection from ~~or to~~ the element. As an example the elements could be either cooled down or heated up with cold or hot air flowing in between the elements or the air flowing in between the elements could be either heated or cooled down by the elements. The one or the other situation could be selected based upon which heating or cooling procedure that would be beneficial for a specific case. In a regular cooling process it would make most sense to let the elements be cooled down with cold air produced in a regular cooling element, e.g. comprising a compressor and an evaporator. In a regular heating process on the other hand, it may make more sense to let the air be heated as it passes the elements, which are heated, from internal electric heating elements.

Please replace paragraph 1 (lines 8-21) on page 5 with the following amended paragraph.

The thermal chamber may be provided with a number of additional conveyors. The additional conveyors could be provided with belts having a partly open surface towards the thermal media. As an example the belts can be regular plastic belts with a 20, 30 or even 40 percent open structure allowing the thermal media to path through the belts. Such belts would not support thermal ~~convection~~ conduction directly between ~~from~~ the belt and ~~to~~ the product items but would ~~support~~ allow the thermal media to flow through the belt and therefore support the convection between ~~from~~ the thermal media and ~~to~~

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the product. The convection e.g. between ~~from~~ air and ~~to~~ the product would not be as effective as ~~convection~~ conduction directly between ~~from~~ a belt and ~~to~~ a product fully supported on the surface of the belt. Still the convection is relatively effective in the case where the products are not lying firmly against the surface of the belt anyway and that would typically be the case after the products have been thrown from one belt to another. The plastic belts or similar regular belts can be used e.g. to full freeze the products by convection between the air and the products.

Please replace paragraph 3 (lines 34-2) on pages 5 and 6 with the following amended paragraph.

*B5*  
~~According to another~~ Another aspect the invention relates to a method of thermally processing product items in a thermal processing chamber provided with a thermal media, said method comprising the steps of:

- conveying the product items through the chamber on a plurality of thermally conductive elements,
- thermally processing the product by providing a thermal conduction ~~convection~~ between ~~from~~ the elements and ~~to~~ the product items, and
- simultaneously providing a thermal convection between ~~from~~ the thermal media and ~~to~~ the product items.

Please replace paragraph 3 (lines 28-32) on page 6 with the following amended paragraph.

*B4*  
The food products are cooled partially by means of conduction ~~convection~~ between a form freezing conveyor belt and the food and partly by means of convection between cold air in the cooling chamber and the food. The temperature in the cooling chamber is approximately minus 38 degrees Celsius, which gives a fast and efficient cooling.

Please replace paragraphs 4 and 5 (lines 17-3) on pages 8 and 9 with the following amended paragraphs.

*B7*  
The beams 18 are made from ~~aluminium~~ aluminum, but it could be made from any material having a good thermal conductivity. The ~~aluminium~~ aluminum profiles may preferably be coated with a plastic coating such as a PTFE or Teflon™ ~~™~~ coating. The coating enables the form frozen food items easily to drop off ~~of~~ the belt instead of sticking to the belt and further protects the ~~aluminium~~ aluminum from corroding. The beams are provided with a wing shaped cross sectional shape enabling a turbulence free stream of air to pass through the passage 30 between the downward oriented beams. In addition the smooth shape of the surface increases the quality and thus the value of the form frozen product further.

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B<sub>4</sub>

The wing formed cross sectional shape of the beams provides a top part of the beams, when raised to a ~~horizontal~~ horizontal position, which top part forms a platform for form freezing of the products. The products lying on the platform ~~quikly~~ quickly form freezes with a planar ~~plan~~ surface towards the planar ~~plan~~ platform, both due to the cooling inducted from the beams below the products and due to the cooling from the cold air from above the products. After the ~~from~~ form freezing the stiffness of the products hinders ~~that~~ the shape changes in the rest of the process when moving between the conveyors of the chamber. The very high heat conduction ~~convection~~ capabilities of the aluminium ~~aluminum~~ beams ensures that the cooling of the products is extremely fast compared with the cooling of traditional conveyors made of plastic or made of a steel grid where consequently only the thermal convection from cold air contributes to the cooling. In the conveyor according to the present invention, both the surface freezing due to the thermal conductance of the cold aluminium ~~aluminum~~ and the cooling from the cold air is used.

Please replace paragraph 2 (lines 5-8) on page 9 with the following amended paragraph.

B<sub>7</sub>

The shape of the beams not only increases the air flow around the product but also ensures a ~~homogen~~ homogenous air flow, and ~~controls~~ controls the airflow in such a way that it hinders hot spots around the product. At the same time the beams are moving and therefore the air flow gets more ~~homogen~~ homogenous.

Please replace paragraphs 1 and 2 (lines 5-26) on page 10 with the following amended paragraph.

B<sub>8</sub>

The full freezing conveyors 3 and 4 are made of PE-plastic with half open ~~conveyor~~ conveyor belts and with steel side-chains made of stainless steel on each side. By using steel side-chains and conveyor belts made of plastic, a heating expansion on the plastic conveyor can be reduced. The steel side-chain hinders the expansion of the plastic conveyor and has the same heat expansion coefficient as the frame, at a position where the conveyors are. There it is not a to heat up the chamber e.g. for the defrosting of the evaporators. By defrosting the evaporator the temperature goes from appr. -38°C up to appr. 30°C and so there will be significant expansion of the regular plastic conveyors. This construction of the full freezing conveyors enables better glazing abilities than with the known constructions for full freezing, where glazing is performed after the product leaves the freezer. During that procedure it may happen that the temperature of the products is lowered by the glazing so that the product ~~looses~~ loses its quality. Furthermore the products can freeze together which again lowers the price of the product.

The conveyors are driven by frequency controlled electrical gear motors which work

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independently. On the end of these gear motors, ~~impuls~~ impulse indicators are connected to sensors so that a control computer can count the pulses and therefrom calculate the location of each beam in the belt conveyor. A connected control computer, e.g in the form of an industrial PC - not shown in the Figs. can therefore at all time track the exact loop position of the conveyors independently and therefrom regulate the system. The control of the chamber may preferably be performed with a software code stored in the memory of the industrial computer.

As seen in Fig. 3 the food products, such as a fish fillet 21 is supported on a ~~plan~~ planar continuous upper surface across at least a number of the beams 18.

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